

Technical Data Pilot Burner GF189



Fig. 1 Side view of GF189 pilot burner design A/B

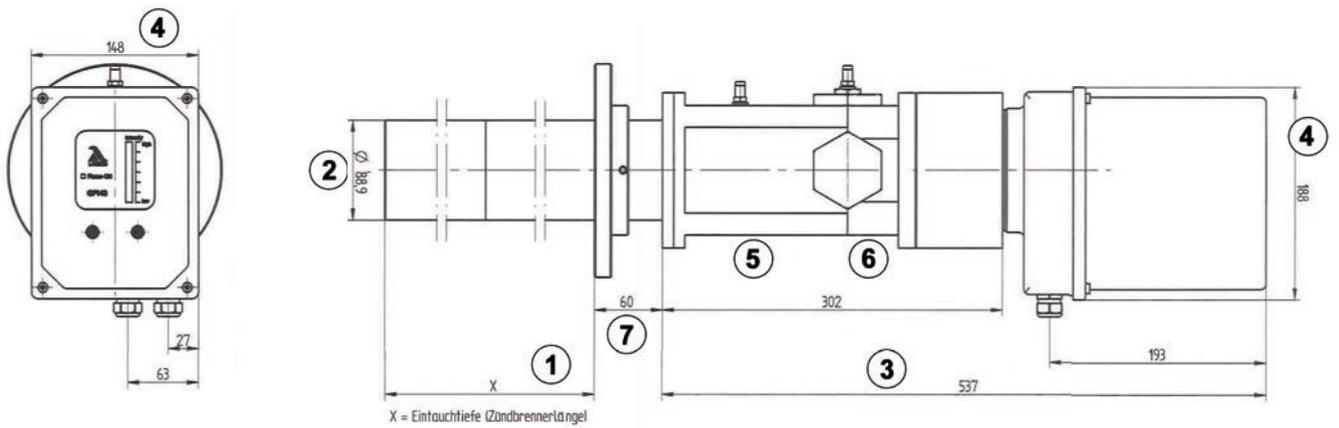


Fig. 2 Dimensions of GF170 pilot burner design A/B



Fig. 3 Side view of GF189 pilot burner Ex-Zone 2

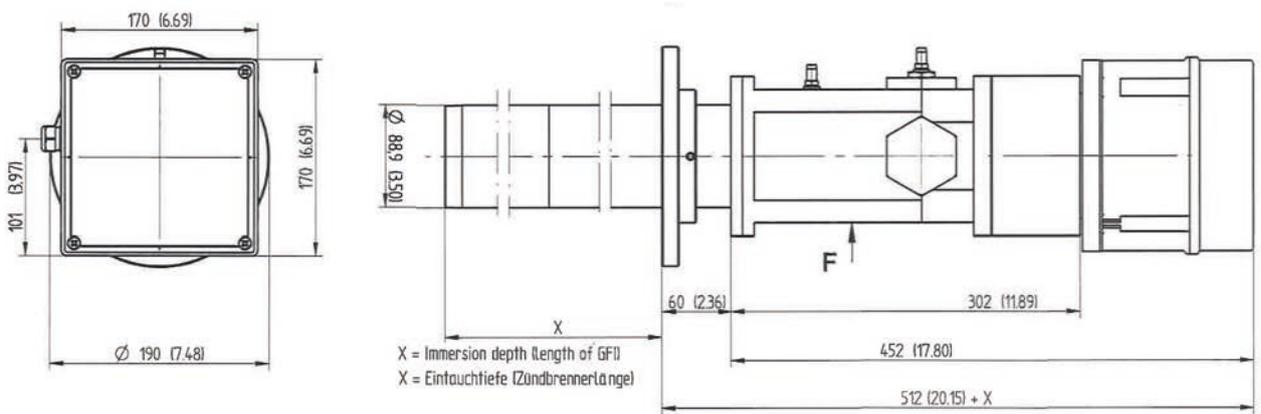


Fig. 4 Dimensions of GF170 pilot burner Ex-Zone 2

Technical Data Pilot Burner GFI89



Fig. 5 Side view of GFI89 pilot burner design C

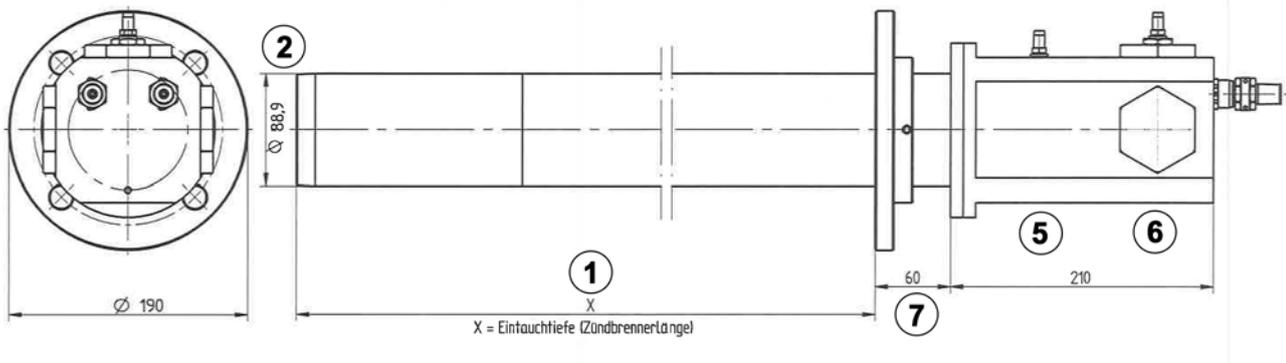


Fig. 6 Dimensions of GFI89 pilot burner design C

1	Dimension outer tube length	(customer-specific)
2	Outer tube diameter	GFI89: 88.9 mm x 2 mm (3.5 x 0.078 in)
3	Housing length versions A and B	
4	Housing dimensions	
5	Air supply connection	2 inch (BSPP inner threads)
6	Gas supply connection	1 1/2 inch (BSPP inner threads)
7	Distance between housing and connection flange	

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Common Technical Data for Pilot Burner GFI48/70/89

NOTICE

The electrical data are identical for all devices, only the air and gas volume flows differ.

Design A and B: Power supply voltage connection

Electrical data	120/230 VAC (within the scope of the EU Gas Appliances Directive), cf. rating plate Mains tolerance according to DIN EN 60730-1
Mains frequency	50/60 Hz
Power consumption	at rated voltage = 230 V 230 VA ignition transformer, 10 VA flame scanner at rated voltage = 120 V, 192 VA ignition transformer, 10 VA flame scanner
Ignition transformer duty cycle	switch-on duration = 16 % on 1 min. (10" on; 50" off) - 20 °C < Ta < 60 °C
External device fuse (mandatory)	4 A

Integrated flame scanner

SIL-classification level	SIL 3
Ionisation input	
Ionisation current	from 1 μ ADC flame ON
Operating mode	continuous operation capable
Flame signal output contact	
Contact type	safety-oriented, floating contact
Contact type	NO, for "flame on", the contact is closed
Level of protection	SKII, base isolation for the status signal
Permissible switching voltage ¹	≤ 230 VAC ≤ 48 VDC
Permissible switching current ^{1, 2}	max. 0.5 A cos φ 0.4 Min. 10 mA
Contact fusing	0.5 AT (internal, soldered)
Safety time (FFDT)	
Response time in the event of the flame failure	t_V off configurable via DIP switches to 1 s or 3 s (standard 1 s)
Switch-on time	t_V on ≤ 1 s
Measuring shunt	runs mains potential
Transmission ratio of measurement voltage to ionisation current	10 mV (DC) = 1 μ A (DC)
Basic error	≤ 2 %
Electrical safety	contact protection by means of protective impedances
Min. impedance of the connected measuring device	1 M Ω

¹ The product is not permitted to be transported, stored or operated outside the specified range. Doing so will invalidate any guarantees with regard to safety relevant functions.

² Provide external spark quenching for inductive loads, do not connect any capacitive loads.

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NOTICE

Use device manufacturer recommended silicone shielded cable. The device manufacturer will only guarantee proper functioning if this cable is used. This cable is available in any length up to the maximum cable length.

Design B and C: Connection of external flame scanner to the ionisation electrode

Recommended cable specifications	
Cable type	RG62 coaxial cable
Cable lengths	< 10 m / 32,8 ft
Inner conductor	solid copper-plated steel wire, uninsulated \varnothing : 0.64 \pm 0.025 mm / 0.025 \pm 0,00098 in
Wire insulation	PE hollow space insulation (helix made from PE strands with PE hose on top) \varnothing : 3.7 mm / 0.14 in
Shield	braided from bare Cu wires, 96 % coverage (nominal value)
Outer shell	PVC, black outside diameter: 6.15 \pm 0.18 mm / 0.24 \pm 0.0070 in)
Conductor resistance	max. 144 Ohm/km
Operating capacity	max. 43 pF/m (1 kHz)
Rated voltage	0.8 kV (50 Hz)
Test voltage	2 kV
Temperature range	-40 ... 80 °C / -40 ... 176 °F (fixed installation)

Design B and C: Power supply voltage connection to the external ignition transformer

Recommended cable specifications	
Cable lengths	max. 200 m / 656.168 ft
Cable cross-section	3 x 1.0 mm ² / 3 x 17 AWG
Isolation	PVC
Temperature range	-40 ... +90 °C / -40 ... 194 °F

Design B and C: Connection of external ignition transformer to the ignition electrode

Electrical data	
Ignition voltage to earth	max. 8 kV (at rated voltage = 230 V) max. 7 kV (at rated voltage = 120 V) For Ex Zone 2 applies: max. 5 kV for both voltage ranges
Recommended cable specifications	
Cable lengths	max. 20 m / 65.62 ft
Cable cross-section	1 x 1.0 mm ² / 1 x 17 AWG
Isolation	Silicone, red-brown
Temperature range	-60 ... +180 °C / -76 ... +356 °F

Design B and C: Ground cable

Recommended cable specifications	
Cable lengths	max. 200 m / 656.168 ft
Cable cross-section	1 x 1.5 mm ² / 1 x 15 AWG and/or according to regional regulation

Technical Data Pilot Burner GFI89

Mode of operation

Permitted mode of operation	intermittent operation/continuous operation
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Operating condition

Relative humidity	max. 85 % (non-condensing)
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Environmental conditions

Operation	Permissible temperature range	Safe Area: -20...+60 °C / -4 ... +140 °F (Standard, without display) -40...+60 °C / -40 ... +140 °F (Special, without display) 0...+60 °C / -32 ... +140 °F (with display) Ex-Zone 2: -20...+60 °C / -4 ... +140 °F
Transport	Permissible temperature range	-20 ... +60 °C / -4 ... +140 °F
Storage	Permissible temperature range	-20 ... +60 °C / -4 ... +140 °F
Degree of protection	DIN EN 60529	IP65 / NEMA 4 / NEMA 4X



DANGER!

High voltage on the bare ignition electrode!

- ▶ Pilot burner is only permitted to be operated with correct earthing.
With version C in particular there is a danger of death when removing or omitting the earthing, the housing earthing must be connected directly to the ignition transformer earthing!
- ▶ In the event of damage to the earthing insulation, the device should be shut down; further operation without repair is not permitted.

Technical Data Pilot Burner GFI89

Integrated standard power unit safe area

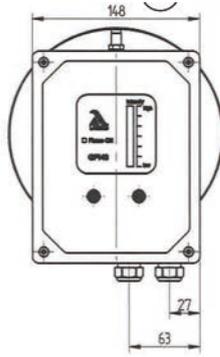


Fig. 7 Side view Integrated standard power unit safe area

Fig. 8 Dimensions Integrated standard power unit safe area

Degree of protection	IP 65 / NEMA 4 / NEMA 4X
Design	with or without display

Integrated power unit Ex-Zone 2

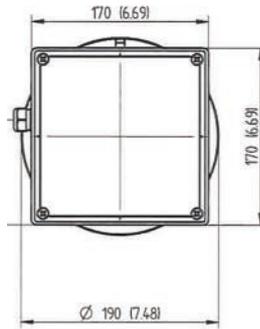
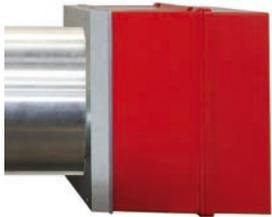


Fig. 9 Side view integrated power unit Ex-Zone 2

Fig. 10 Dimensions integrated power unit Ex-Zone 2

Degree of protection	IP 65 / NEMA 4 / NEMA 4X
Type	no display possible
Device marking	Ex ec nC IIB+H2 T4 Gc (with flame scanner) Ex ec IIB+H2 T4 Gc (without flame scanner)
IEC Standards	IEC 60079-0:2017; IEC 60079-7:2015; IEC 60079-15:2010
certificate no.:	IECEx KIWA 20.0005X

NOTICE

The free ends of the unterminated cable shall be connected in a suitable certified enclosure (e.g. Ex e) or outside the hazardous area.

-The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1.

-Transient protection shall be provided that is set to a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.

- The cable glands are tested with a reduced tensile force (25 %) in accordance with clause A.3.1 of IEC 60079-0 and may only be used for fixed installation apparatus. The user shall ensure adequate clamping of the cable.

- The cable gland size M16 is tested for low risk of mechanical danger (drop height 0.4 m with 1 kg mass) and shall be protected against higher impact energy levels.

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Thermal Power*

Thermal power	GFI48: 70 ... 130 kW (propane gas) 70 ... 140kW (natural gas) GFI70: 150 ... 300 kW GFI89: 400 ... 700 kW
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Connection: GFI48 gas

Gas type	Natural gas or propane
Flow rate (gas quantity)	Natural gas: 8.0 ... 15.0 m ³ /h (10.46 ... 19.61 yd ³ /h) Propane: 3.2 ... 6.0 m ³ /h (4.18 ... 7.84 yd ³ /h)
Operating pressure	Min. 50 mbar (0.725 psi) Max. 200 mbar (2.90 psi)

Connection: GFI70 gas

Gas type	Natural gas or propane
Flow rate (gas quantity)	Natural gas: 15.0 ... 30.0 m ³ /h (19.61 ... 39.23 yd ³ /h) Propane: 6 ... 12.0 m ³ /h (7.84 yd ³ /h ... 15.69 yd ³ /h)
Operating pressure	Min. 50 mbar (0.725 psi) Max. 200 mbar (2.90 psi)

Connection: GFI89 gas

Gas type	Natural gas or propane
Flow rate (gas quantity)	Natural gas: 35.0 ... 70.0 m ³ /h (45.77 ... 91.55 yd ³ /h) Propane: 14 ... 28.0 m ³ /h (18.31 ... 36.62 yd ³ /h)
Operating pressure	Min. 50 mbar (0.725 psi) Max. 200 mbar (2.90 psi)

NOTICE

Higher pressure ratings can be realised by connecting a restrictor upstream.

Connection: Air

Air type	Combustion air
Operating pressure	GFI48/70: min. 15 mbar (0.217 psi) + 6 mbar (0.087 psi) per metre of tube length GFI89: min. 15 mbar 0.217 psi) + 5 mbar (0.087 psi) per metre of tube length
Air temperature	max. 80 °C (176 °F)
Relative air humidity	max. 70 %
Air quality	Free of dust, oil, grease and aerosols The quality for the compressed air supply should conform to ISO 8573-1:2010 class (7 : 4 : 4). Non-observance can result in short-circuits due to material deposits in the housing.
Air ratio	0.3 ... 0.5 (the remaining air quantity must be provided by the combustion chamber)
Flow rate (air quantity)	GFI48: max. 50 m ³ /h (65.39 yd ³ /h) GFI70: max. 150 m ³ /h (196.19 yd ³ /h) GFI89: max. 250 m ³ /h (326.98 yd ³ /h)

NOTICE

At temperatures in the combustion chamber of over 500 °C (932 °F), if the pilot burner is off, a cooling air supply of 50 % of the max. combustion air should be provided.

* At International Standard Atmosphere, ISA: 15 °C, 1013,25 hPa

Technical Data Pilot Burner GFI89

Thermal rating with high power versions*

GFI48	natural gas: 250 ... 400 kW propane: 250 ... 400 kW
GFI70	natural gas: 500 ... 800 kW propane: 500 ... 800 kW
GFI89	natural gas I: 2300 ... 3000 kW natural gas II: 4600 ... 6000 kW propane: 2300 ... 3000 kW

Connection: GFI48 gas

Flow rate (gas quantity)	natural gas: 25 ... 40 m ³ /h (32.69 ... 52.31 yd ³ /h) propane: 9.5 ... 15 m ³ /h (12.42 ... 19.61 yd ³ /h)
Operating pressure	natural gas: 500 ... 1000 mbar (7.25 ... 14.50 psi) propane: 400 ... 800 mbar (5.80 ... 11.60 psi)

Connection: GFI70 gas

Flow rate (gas quantity)	natural gas: 50 ... 80 m ³ /h (65.39 ... 104.63 yd ³ /h) propane: 19 ... 31 m ³ /h (24.85 ... 40.54 yd ³ /h)
Operating pressure	natural gas: 500 ... 1000 mbar (7.25 ... 14.50 psi) propane: 500 ... 1000 mbar (7.25 ... 14.50 psi)

Connection: GFI89 gas

Flow rate (gas quantity)	natural gas I: 230 ... 300 m ³ /h (300.82 ... 392.38 yd ³ /h) natural gas II: 460 ... 600 m ³ /h (601.65 ... 784.76 yd ³ /h) propane: 90 ... 115 m ³ /h (117.71 ... 150.41 yd ³ /h)
Operating pressure	natural gas I: 700 ... 1000 mbar (10.15 ... 14.50 psi) natural gas II: 700 ... 1000 mbar (10.15 ... 14.50 psi) propane: 700 ... 1000 mbar (10.15 ... 14.50 psi)

NOTICE

This is not a control range as for a burner as the appropriate air volume must be set accordingly when changing the gas pre-pressure.

Technical Data Pilot Burner GFI89

Connection: Air

Air type	combustion air
Operating pressure	GFI48/70: min. 15 mbar + 6 mbar (0.217 psi + 0.087 psi) per metre of tube length GFI89: min. 15 mbar + 5 mbar (0.217 psi + 0.072 psi) per metre of tube length
Air temperature	max. 80 °C (176 °F)
Relative air humidity	max. 70 %
Air quality	free of dust, oil, grease and aerosols The quality for the compressed air supply should conform to ISO 8573-1:2010 class (7 : 4 : 4). Non-observance can result in short-circuits due to material deposits in the housing.
Air ratio	0.3 ... 0.5 (the remaining air quantity must be provided by the combustion chamber)
Flow rate (air quantity)	GFI48: max. 50 m ³ /h (65.39 yd ³ /h) GFI70: max. 150 m ³ /h (196.19 yd ³ /h) GFI89: max. 250 m ³ /h (326.98 yd ³ /h)

NOTICE

At temperatures in the combustion chamber of over 500°C (932 °F), if the pilot burner is off, a cooling air supply of 50% of the max. combustion air should be provided.

* At International Standard Atmosphere, ISA: 15 °C, 1013,25 hPa

Technical Data Pilot Burner GFI89

Order Information

Ignitor and Pilot Burner

89 mm / 3.5 "in GFI89, Performance Range 400 ... 700 kW

Configuration

Description / Type	Order-no.
Ignitor and pilot burner GFI89, 400 ... 700 kW, installation diameter 89 mm / 3.5 "in	646R0089...
A10 "RANGE OF APPLICATION"	
	Selection
SAFETY AREA (NO EXPLOSIVE ATMOSPHERE)	SAF
Ex-ZONE 2	EX2
Ex-ZONE 1	EX1
FOR USE WITH EXTERNAL POWER UNIT IN WALL-MOUNTED HOUSING	EXS
FOR USE WITH EXTERNAL EX-POWER UNIT IN WALL-MOUNTED HOUSING	EXH
A20 "FUEL"	
	Selection
NATURAL GAS	N
PROPANE/BUTANE (LPG)	P
COKE-OVEN GAS (ANALYSIS REQUIRED)	C
2 GAS TYPES IN ALTERNATING OPERATION (NATURAL GAS / LPG)	X
A30 "TUBE LENGTH"	
	Selection
BASELINE 300 mm / 11.81 "in, Material stainless steel 1.4301 / end section 1.4841	V2A
ADDITIONAL PIPE LENGTH 300 mm / 11.81 "in each, Material stainless steel 1.4301 (up to 6 m total length possible)	
BASELINE 300 mm / 11.81 "in, Material stainless steel 1.4571 / end section 1.4841	V4A
ADDITIONAL PIPE LENGTH 300 mm / 11.81 "in each, Material stainless steel 1.4571 (up to 6 m total length possible)	
A40 "IGNITION TRANSFORMER"	
	Selection
WITHOUT IGNITION TRANSFORMER, EXTERNAL IGNITION	0
INTEGRATED IGNITION TRANSFORMER	TR
A45 "IONIZATION FLAME MONITOR"	
	Selection
WITHOUT IONIZATION ELECTRODE, WITHOUT IONIZATION FLAME MONITORING, EXTERNAL MONITORING	0
IONIZATION ELECTRODE, WITHOUT IONIZATION FLAME MONITORING, EXTERNAL MONITORING	IO
INTEGRATED IONIZING FLAME MONITORING (IFM), 0 ... 60 °C / 32 ... 140 °F, SIL3 AND RELAY OUTPUT MAKE CONTACT (NO) 230 VAC/0.5 A, FFDT 1S	IFM
INTEGRATED IONIZING FLAME MONITORING (IFM), 0 ... 60 °C / 32 ... 140 °F, SIL3 AND RELAY OUTPUT MAKE CONTACT (NO) 230 VAC/0.5 A, FFDT 3S	IFM3
A50 "SUPPLY VOLTAGE"	
	Selection
230 VAC, 50/60 Hz	230VAC
120 VAC, 50/60 Hz	120VAC

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A60 "CONNECTION TYPE"	Selection
WITH PLUG (2X 7-PIN), WITHOUT MATING CONNECTOR *	STE
WITH PLUG (2X 7-PIN), WITH MATING PLUG (FOR SELF-ASSEMBLY)	STEG
2 m / 6.6 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	2M
5 m / 16.4 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	5M
10 m / 32.81 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	10M
20 m / 65.34 ft CABLE, 7-CORE FIRMLY CONNECTED WITH FREE CABLE ENDS	20M

* Additional required: Connecting cable order no. 646R0150

A62 "CABLE GLAND"	Selection
WITHOUT CABLE GLAND	0
1X CABLE GLAND M20, NICKEL-PLATED BRASS	M20
1X ATEX CABLE GLAND M20 CONDUIT, ½" NPT, NICKEL-PLATED BRASS	M20CU

A65 "GAS/ AIR CONNECTION"	Selection
GAS CONNECTION G2" ISO, AIR CONNECTION G2" ISO (STANDARD)	G2

A70 "PRESSURE STAGE"	Selection
UP TO 200 mbar BACK PRESSURE	0,2B

A80 "MOUNTING"	Selection
WITHOUT FIXED FLANGE*	0
DN80 PN6 FIXED FLANGE, WELDED, STAINLESS STEEL 1.4571	WE80SS

* Additionally required if necessary: Sliding flange (under accessories)

A85 "POWER UNIT"	Selection
WITHOUT POWER UNIT FOR TRANSFORMER/IFM (EXTERNAL IGNITION/MONITORING)	0
POWER UNIT, SAFE AREA, IN ALUMINIUM HOUSING WITHOUT BAR GRAPH	AL
POWER UNIT, SAFE AREA, IN ALUMINIUM HOUSING WITH BAR GRAPH	ALIN
POWER UNIT, EX ZONE II (NO BAR GRAPH POSSIBLE)	GEX2

A87 "HOUSING SURFACE"	Selection
C2 POWDER COATING, RAL3020 TRAFFIC RED / RAL 7016 ANTHRACITE GREY	STD
C4 TWO-COAT PAINT, RAL3020 TRAFFIC RED	C4

A90 "CUSTOMER"	Selection
STANDARD	STD

A99 "SPECIAL CONFIGURATION"	Selection
THERMAL POWER 3,000 kW (IN THE SCOPE OF THE NFPA)	L20
THERMAL POWER 6,000 kW (IN THE SCOPE OF THE NFPA)	L21

Technical Data Pilot Burner GFI89

Spare parts for GFI89

Description / Type	Order no.
Ionization and ignition electrode with distance and centring holder for the electrode rods	646R3115
Distance and centring holder with insulating piece for the electrode rods	646R3116
Flame stabilizer, material 1.4301/1.4305	646R3100
Nozzle for natural gas	646R3105
Nozzle for propane gas	646R3106

Spare parts for GFI48 / GFI70 / GFI89

Description / Type	Order no.
Ignition transformer for GFI ignition systems, 230 VAC / 8 kV	646P1040
Ignition transformer for GFI ignition systems, 120 VAC / 8 kV	646P1041
Ionizing flame monitoring (IFM) F130i, SIL3, supply voltage 230 VAC, for DIN rail mounting, continuous operation, FFDT 1 s	659G1001
Ionizing flame monitoring (IFM) F130i, SIL3, supply voltage 120 VAC, for DIN rail mounting, continuous operation, FFDT 1 s	659G1002

Ignitor and Pilot Burner - Accessories

Sliding Flange

Description / Type	Order no.
GFI48 Sliding flange with O-ring seal and grub screws, DN50 PN6, 1.4571 (4 fixing holes)	646R1151
GFI48 Special sliding flange with O-ring seal and grub screws, 1.4571 (2 fixing holes)	646R1152
GFI70 Sliding flange with O-ring seal and grub screws, DN65 PN6, 1.4571 (4 fixing holes)	646R2151
GFI89 Sliding flange with O-ring seal and grub screws, DN80 PN6, 1.4571 (4 fixing holes)	646R3151

Connecting cable

Description / Type	Order no.
Connection cable with counter plug, length 2 m	646R0150

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General

Description / Type	Order no.
Double nipple 3", material: 1.4408	646R9001
Double nipple 1" external thread, stainless steel	646R9015
Double nipple R1 1/2" external thread, stainless steel	646R9016
Double nipple R1 3/4" external thread, stainless steel	646R9014
Double nipple R1 2" external thread, stainless steel	646R9017
Hexagonal Reducing Nipple NPT 3/4" to R 1/2", material: 1.4571	646R9030
Hexagonal Reducing Nipple NPT 1 1/4" to R 1", material: 1.4571	646R9031
Conical reducer R 1/2 A X G 3/4 I MS.vernickelt	646R9032
Stainless steel pressure gauge 0 ... 160 mbar, housing Ø 63 mm, connection G1/8" vertical	646R9040
Sliding nipple with O-ring seal and 3" male thread, 1.4301, for GFI48	646R9055
Needle valve 1 1/4" NPT inside thread, material 1.4571	646R9058
Needle valve 3/4" NPT inside thread, material 1.4571	646R9059
Ball valve for gas 1/2" internal/external thread, with DVGW certification, brass	646R9060
Ball valve for gas 3/4" internal/external thread, with DVGW certification, brass	646R9061
Ball valve for gas 1 1/2" internal/external thread, with DVGW certification, brass	646R9062
Ball valve for gas 2" internal/external thread, with DVGW certification, brass	646R9063
Ball valve (Mini) Ballofix for gas 3/4" internal/external thread, brass	646R9065
Ball valve (stainless steel) 3" IG/IG with lever handle, DN80	646R9069
Air regulating sleeve 1" internal thread, malleable cast iron black	646R9102
Air regulating sleeve 1 1/2" internal thread malleable cast iron black	646R9103
Air regulating sleeve 3/4" internal thread, malleable cast iron black	646R9104
Air regulating sleeve 2" internal thread malleable cast iron black	646R9105

Commissioning / maintenance / service

Description / Type	Order no.
Inspection diode for GFI	646R0100



The information in this publication is subject to technical changes.



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